

# Pre-Blended Mortar and Grout Bulk Delivery Systems

## The Problem

When laborers mix mortar or grout in the traditional way, they have to lift heavy cement bags and shovel sand into the mixer. They usually repeat these motions over and over. Full cement bags weigh around 100 pounds, and workers may handle more than 100 bags a day.

Workers are at risk of back pain, shoulder pain, and even disabling muscle or joint injuries. The injuries can be the result of one-time accidents, but they usually develop over a long period of time.

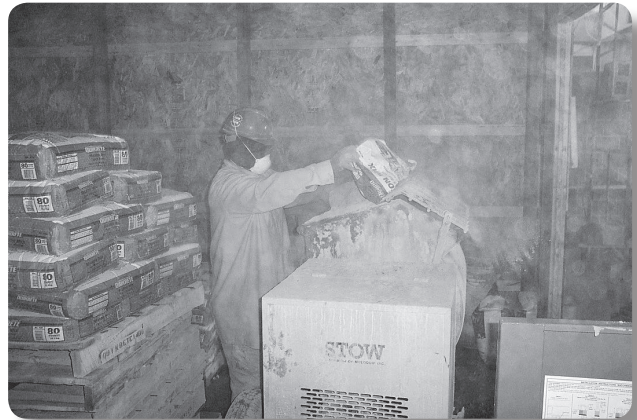
Your risk of injury from lifting and shoveling depends on the weight of the load, the number of loads you lift, how long you do this work, and where the bags are placed. If you have to stoop down to a low pallet to pick up bags, or reach above your shoulders to dump them, your risk is especially high. You have even more risk if you twist your body while lifting.

## One Solution

Use **pre-blended mortar and grout mix** for the job. This can be delivered to the site in bulk and doesn't require lifting bags or shoveling sand.

Bulk pre-blended mortar and grout can be used with conventional mixers or with European-style silo mixers. All dry ingredients are handled mechanically, with either a forklift or boom truck, eliminating the risk of injury due to manual handling.

*Problem: Traditional method of loading mixer*



*Solution: Loading a silo system*



## How It Works

Pre-blended dry ingredients (including sand, pigments, and admixtures) are delivered to the site in 2,000 – 3,000 pound bulk bags. These are moved by forklift or boom truck over a funnel-shaped silo that straddles a conventional mortar mixer. The mix is released into the silo by pulling a hitch pin on the bag. To begin mixing, the mixer operator simply pulls a handle that opens the silo's discharge slide gate. The pre-blended material is gravity-fed from the silo directly into the mixer below. No electricity is needed. Only water needs to be added to produce the mortar and grout.

## Benefits for the Worker and Employer

Laborers have less risk of disabling injuries due to constant manual lifting. Productivity is also increased because time-consuming manual handling of bags and sand is eliminated. One laborer may be able to tend two or three mixers.

With silo systems, bags don't break or leak. The product is more consistent because it is pre-mixed. There is no problem of sand freezing in winter. Silo dispensers can save space on congested jobsites and reduce material theft. Most silo systems are easily moved around the jobsite. Disposal of bags is not a problem since all bulk bags are removed by the supplier and either reused or recycled.

These systems do not eliminate the risk of silica dust exposure, but dust curtains are available to reduce the release of silica-containing dust. Specific safety procedures must be followed when loading the silo, climbing the silo's ladder, and moving the system.

## Approximate Cost

Contractors estimate that using these systems adds about 7 - 8% to mortar cost. However, the additional cost may be offset by improvements in efficiency and productivity gains. Pre-blended mortar systems may not be cost-effective for smaller jobs. A supplier, however, should be able to help you determine if this product is appropriate for your work.

## For More Information

- Products related to this solution are described at [www.cpwr.com/simple.html](http://www.cpwr.com/simple.html). Products also may be found on the internet using the following search terms: (silo or bulk) "delivery systems."
- Local contractor tool and equipment suppliers or rental companies may be another source of information on products.
- For general information on this solution, check [www.cpwrconstructionsolutions.org](http://www.cpwrconstructionsolutions.org) and [www.elcosh.org](http://www.elcosh.org).